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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,520	01/30/2007	Peilong Tan	4202-02300	3714

30652 7590 10/27/2009

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EXAMINER	
SEKUL, MARIA LYNN	

ART UNIT	PAPER NUMBER
2461	

MAIL DATE	DELIVERY MODE
10/27/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/576,520	TAN ET AL.	
	Examiner	Art Unit	
	MARIA L. SEKUL	2461	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-7,10,13-16 and 19-22* is/are rejected.

7)☐ Claim(s) *8,9,11,12,17 and 18* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claim 1, and therefore to dependent claims 2-21, have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. **Claims 1, 4, 13 and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Choi et al. (US Patent 7,362,975)** (hereinafter Choi) in view of **Song et al. (US PGPub 2003/0190168)** ("Song").

As to **Claim 1**, Choi discloses a method comprising:" a) classifying, by the OLT, services which are to be communicated between the OLT and an ONU into a plurality of service types according to different transmitting requirements and granting a different priority to each type of the services" (Choi discloses classifying services and assigning different priorities using Class of Service (COS) for allocating bandwidth in a PON, **col. 4, lines 15-25, 49-65**);

"b) authorizing, by the OLT, a service [ ] of every type of services to transmit service data in descending sequence of said priorities of the services" (Choi discloses a grant generator that generates a service-based bandwidth in descending priority and transmits a control message to the ONU; for each ONU, grant information is provided for each type of service **Figs. 3b and 4a; col. 5, lines 9-13**).

"reading out, by the OLT, said granting information of every to-be-granted service [ ] of the same ONU " (MPCP Allocator 210 obtains information of the queue levels of each service requested by each ONU, **col. 5, lines 5-13**); and

"d) scheduling, by the OLT, start time of granted data transmission of every to-be-granted service [ ] of current ONU" (Choi discloses sending a GATE (downlink) message with start time of granted timeslot; **col. 5, lines 34-38**);

"generating a downlink granting message including both said granting information and said start time of granted data transmission of every granted [service] of said current ONU, and transmitting said downlink granting messages to said current ONU" (Choi further discloses sending a GATE (downlink) message with grant information and start time of granted timeslot; **Fig. 3; col. 5, lines 34-38**;; **Fig. 4a-b** in Choi shows how the bandwidth is assigned to each ONU based on service priority).

"and recording the granting information of the service [ ] obtained from the authorization and c) reading out said granting information of every to-be-granted service [ ] of the same ONU" (**Fig. 3** shows the Class-based Queue State Counter 212 generating a GATE message which includes all the granting information authorized for an ONU based on service level, length and start time. It is implicit in Choi that in order to generate this GATE message the granting information was recorded during the granting phase then read out in order to formulate the message).

Choi discloses the authorizing, reading and scheduling steps are performed for each service at the ONU but does not explicitly disclose that the steps are performed for a "service port" of every type of services.

Song teaches a logical link identifier (LLID) for use in downstream transmission to the ONU side or upstream transmission to the OLT side (**Fig. 4; ¶ 32**). The LLIDs represent a unique ID assigned during registration of an object of the ONU side which may be a subscriber port or classified service port (**¶ 35**). **Fig. 13** shows each of the ONUs 550, 610, 650 includes one or more of service ports or subscriber ports S1-S9 and each of the subscriber/service ports S1-S9 is assigned a unique LLID (**¶ 50**).

Song and Choi are analogous in the art because they pertain to passive optical networks. It would have been obvious to one skilled in the art at the time the invention was made to use the LLID to identify a service port of an ONU with the method of allocating service bandwidth in Choi for the purpose of supporting multiple services by assigning LLIDs to service ports according to service type to guarantee Qos during multiple services, as stated in Song **(¶ 56)**.

Note: the above analysis applies to all dependent claims that reference "service port", but will not be repeated for each dependent claim in order to maintain readability of this office action since the term "service port" is interspersed throughout the claims. Therefore, for each dependent claim referencing a "service port", it would have been obvious to perform the method or steps with regard to a service port as taught in Song with the bandwidth allocation method per service as taught in Choi.

As to **Claim 4,** Choi in view of Song discloses all of Claim 1 above.

Choi further discloses "generating, by the OLT, a vMAC Granting information table indexed by ONUID, which includes granting information of each of the service [ ] of the ONUs". Choi discloses an MPCP allocator which performs dynamic bandwidth allocation based on class-based buffer states ("service ports") **(col. 5, lines 1-13)**. The vMAC Granting information table is simply a data structure for storing and managing the granting information per ONU.

Choi further discloses "step of recording granting information in step b) comprises: recording, by the OLT, said granting information in the vMAC Granting information table, setting granted flag of said granted service ports as authorized". This

is simply a step of tracking and managing the granting information. Choi implicitly performs this step when allocating and granting bandwidth with the MPCP allocator and grant generator (**col. 5, lines 1-13**).

Choi discloses "the step of reading out granting information in step c) comprises: searching for table items corresponding to the service ports of the same ONU in the vMAC Granting information table according to ONUID index, searching for granted service ports according to granted flag, reading out granting information of the granted service ports; and after step d) further comprising: setting, by the OLT, the granted flag as negative of the service ports which have read out granting information". As part of the grant generator, Choi implicitly performs reading the granting information and tracking whether the grant message has been generated and sent.

As to **Claim 13**, Choi in view of Song discloses all of Claim 1 above.

Choi further discloses a step after step d) of "determining, by the OLT, whether there is still any ONU with un-granted port, if yes, returning to step c); otherwise, ending". Choi teaches a grant generator that makes grants for each service for each ONU (*see* **col. 5, lines 9-13**).

As to **Claim 14**, Choi in view of Song discloses all of Claim 1 above.

Choi further discloses that "the type of said downlink granting messages of the method is GATE downlink MPCP message". Choi discloses that the grant generator transmits a GATE downlink message to each ONU (**col. 5, lines 9-15**).

As to **Claim 22**, Choi in view of Song discloses all of Claim 1 above.

Choi in view of Song does not explicitly disclose "allocating adjacent granted windows for a group of service ports of the same ONU when generating the downlink granting message".

Choi teaches that the bandwidth for each ONU is granted based on service-level in descending priority such that no bandwidth is granted to a lower priority service until all services with a higher priority have been granted **(col. 5, line 51-col. 6, line 36)**. And Song teaches the registration of service ports of an ONU so that bandwidth can be allocated on a service port basis **(¶ 32)**.

Because bandwidth is assigned at the service level at one time to each ONU, as taught in Choi, it would have been obvious to one skilled in the art at the time the invention was made to allocate bandwidth to all service ports at the same service-level of the same ONU with adjacent start times.

6. **Claims 2, 3 and 5** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Choi et al. (US Patent 7,362,975)** in view of **Song et al. (US PGPub 2003/0190168)** ("Song") of as applied to claim 1 above, and further in view of **Ganesh et al (US Patent 6,956,854)** (hereinafter Ganesh).

For **Claim 2,** Choi in view of Song discloses all of claim 1 as described in paragraph 4 above.

Choi fails to teach the Active Timeout Counter and the flow of aging information disclosed in steps A. through D. in claim 2.

Ganesh from the same or similar fields of endeavor teaches an age field denoted by a variable which is incremented when a fixed period of time is exceeded (**Fig. 2, col. 4, lines 15-26**).

Ganesh further teaches steps A. through D.:

"A. inquiring, by the OLT, status of the ONUs one by one, determining whether the status of current ONU is invalid, if yes, check next ONU".

Ganesh teaches checking entries in the table to ensure a network frame has been received for each entry within a predetermined time period and the age field in the table is used to determine whether the network address associated with a port is still valid (**Fig. 6; col. 7, lines 23-36**).

"B. determining, by the OLT, whether MPCP messages have been reported by said current ONU in the present bandwidth allocation polling period, if yes, resetting corresponding Active Timeout Counter of said current ONU, and proceeding to step C; otherwise, proceeding to step C directly".

Ganesh teaches that when an entry in the table is used, the age field is reset, (**col. 4, lines 24-26**).

"C. determining, by the OLT, whether the value of said Active Timeout Counter of said current ONU exceeds the settled off-line threshold . . ."

Ganesh teaches deleting entries in the table when the age field contains a value that exceeds a timeout value (**Fig. 6; col. 7, lines 23-26**);

and ". . . if yes, setting the status of the current ONU as invalid, releasing corresponding resources of this ONU, proceeding to step D; otherwise, proceeding to step D directly".

Ganesh teaches if the timeout value is exceeded, delete the entry and notify the central management module that sends a message to all other ports that the address is no longer valid. The ports then delete the address from their table, thereby "releasing" the resource (**Fig. 6, col. 7, lines 25-32**).

"D. determining, by the OLT, whether all the ONUs are inquired, if yes, ending the ONU information aging flow of the present bandwidth allocation polling period; otherwise, returning to step A, continuing with the inquiry of a next ONU".

As shown previously, Ganesh teaches a method of checking entries by examining the aging field **(Fig. 6; col. 7, lines 23-25).**

Ganesh and Choi in view of Song are analogous art because they deal with managing network resources, i.e. bandwidth in a network.

It would have been obvious to one skilled in the art at the time the invention was made to use the method of aging a network address as taught in Ganesh with the bandwidth allocation method in Choi being that it allows tracking of inactive ONUs that do not need to be polled for bandwidth allocation.

As to **Claim 3**, Choi in view of Song in view of Ganesh discloses all of Claim 2 above.

Choi further teaches "generating, by the OLT, an ONU Status Information table indexed by ONUID, which is to store every ONU's status information that is generated

according to MPCP messages communication between the ONUs and the OLT". Choi discloses the MPCP allocator which receives messages from ONUs, differentiates the ONUs and obtains queue-state information for each, (**col. 5, lines 5-13**). It is anticipated that Choi will use a data structure to store the information for each ONU.

Ganesh further teaches "generating, by the OLT, an ONU Active Timeout Count table indexed by ONUID, which includes said Active Timeout Counter and reported flags to indicate whether MPCP messages have been reported by corresponding ONUs".

Ganesh teaches a table with an aging field which acts like "Active Timeout Counter" where the aging field is used to reflect the use of the network address associated with a port (**Fig. 2; col. 4, lines 15-26).**

Ganesh further teaches these steps of the claim:

"said step of determining in step A comprises: according to ONUID index, reading out, by the OLT, ONU status information from the ONU Status Information table one by one, determining whether current ONU is invalid according to said ONU status information".

As previously discussed in claim 2, Ganesh teaches checking entries in the table to ensure a network frame has been received for each entry within a predetermined time period and the age field in the table is used to determine whether the network address associated with a port is still valid **(Fig. 6; col. 7, lines 23-36**).

"said step of determining in step B comprises: reading out, by the OLT, table item of said current ONU from Active Timeout Count table, determining whether

there exists a reported flag in corresponding table item of said current ONU, if yes, it can be concluded that MPCP messages have been reported in the present bandwidth allocation polling period; otherwise, it can be concluded that MPCP messages have not been reported".

Ganesh teaches checking entries in the table to ensure a network frame has been received for each entry within a predetermined time period and the age field in the table is used to determine whether the network address associated with a port is still valid (**Fig. 6; col. 7, lines 23-36**).

"between step C and step D, further comprising: clearing, by the OLT, the reported flag of said current ONU in the ONU Active Timeout Count table".

Because there is no step between C and D, and step C always results in going directly to step D, this event is never occurring. Therefore, it is provisionally rejected. However, if this limitation were part of step C, Ganesh teaches that if the aging field exceeds a predetermined limit, the table entry is deleted which has the same effect of clearing the reporting flag. (**Fig. 6; col. 7, lines 24-26**).

"said step of determining in step D comprising: determining, by the OLT, whether all table items of the ONU Status Information table are read out, if yes, it can be concluded that all the ONUs have been inquired; otherwise, it can be concluded that some of the ONUs have not been inquired".

Ganesh teaches checking entries in the table to ensure a network frame has been received for each entry within a predetermined time period and the age field in the

table is used to determine whether the network address associated with a port is still valid (**Fig. 6; col. 7, lines 23-36**).

It would have been obvious to one skilled in the art at the time the invention was made, as stated in claim 2 above, to use the method of aging a network address as taught in Ganesh with the bandwidth allocation method in Choi in view of Song being that it allows tracking of inactive ONUs that do not need to be polled for bandwidth allocation.

As to **Claim 5,** Choi in view of Song teaches all of Claim 1 in paragraph 4 above.

Choi further discloses "generating, by the OLT, the ONU Status Information table indexed by ONUID, which is to store status information of every ONU that is generated according to MPCP messages communication between the ONUs and the OLT". Choi discloses the MPCP allocator which receives messages from ONUs, differentiates the ONUs and obtains queue-state information for each, (**col. 5, lines 5-13**). The ONU Status Information table is simply a data structure. It is anticipated that Choi will use a data structure to store the information for each ONU.

Choi fails to teach "before step c) further comprising: reading out, by the OLT, status information of the ONUs one by one from the ONU Status Information table according to ONUID index, determining whether current ONU status is invalid according to the status information of said current ONU returning to read a next ONU status information in the ONU Status Information table, otherwise, proceeding to step c)".

Ganesh teaches, as discussed directly above in Claim 2, checking entries in the table to ensure a network frame has been received for each entry within a

predetermined time period and the age field in the table is used to determine whether the network address associated with a port is still valid **(Fig. 6; col. 7, lines 23-36)**.

It would have been obvious to one skilled in the art at the time the invention was made, as stated in claim 2 above, to use the method of aging a network address associated as taught in Ganesh with the bandwidth allocation method in Choi in view of Song being that it allows tracking of inactive ONUs that do not need to be polled for bandwidth allocation.

7. **Claim 6** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Choi et al. (US Patent 7,362,975)** (hereinafter Choi) in view of **Song et al. (US PGPub 2003/0190168)** ("Song") as applied in claim 1, and further in view of **Lee et al. (US Patent 7,443,861)** (hereinafter Lee).

As to **Claim 6**, Choi in view of Song discloses all of Claim 1 as previously described in paragraph 4 above.

Choi does not teach "services being classified by priority in descending sequence in step a) as fast forwarding service, automatic detecting MPCP message service, non-automatic detecting MPCP message service, MF service, Assured Forwarding service and Best-Effort Forwarding service."

Lee teaches prioritizing the services in descending order of priority based on service-level (**Fig. 3A-B; col. 7, lines 1-10**).

Choi in view of Song and Lee are analogous art because they deal with allocating bandwidth for different service levels in a PON.

It would have been obvious to one skilled in the art at the time the invention was made to use the descending prioritization of Lee in the bandwidth allocation method of Choi in view of Song being that services with higher quality may be allocated bandwidth before services with lesser quality service requirements.

8. **Claim 7, 10, 15 and 19** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Choi et al. (US Patent 7,362,975)** (hereinafter Choi) in view of **Song et al. (US PGPub 2003/0190168)** ("Song") in view of **Lee et al. (US Patent 7,443,861)** as applied in claim 6 above, and further in view of **Choksi (US Patent 6,978,144)**.

As to **Claim 7**, Choi in view of Song in view of Lee discloses all of Claim 6 in paragraph 7 above.

Choi in view of Song in view of Lee does not explicitly disclose "b11) confirming, by the OLT, current to-be-granted service port according to uplink service activating status".

Choksi teaches a bandwidth allocation controller that processes bandwidth allocation requests and assigns to the proper service-level queue, **(Fig. 2-3; col. 4, lines 47-65)**;

Choi in view of Song in view of Lee does not explicitly disclose "b12) according to the residual bandwidth resource in the current bandwidth allocation polling period, determining, by the OLT, whether current bandwidth resource is available to the constant amount of data of said current to-be granted service port for non-automatic detecting MPCP message service, or to the report information from said current to-be-

granted service port for the other types of the services, if yes, proceeding to step b13); otherwise, proceeding to step b15)".

Choksi teaches allocation of residual bandwidth based on service level if bandwidth is available. (**Fig. 4A-C**)

Choi further discloses "b13) authorizing, by the OLT, said current to-be-granted service port to transmit service data, and recording the current granting information" (Choi discloses a grant generator that generates a service-based bandwidth and transmits a control message thereby authorizing the ONU to transmit an authorized amount of data (**col. 5, lines 9-13**).

Choi in view of Lee does not teach:

"b14) updating, by the OLT, residual bandwidth in the current bandwidth allocation polling period and relevant information of said current to-be-granted service port";

Choksi teaches updating bandwidth usage during allocation based on service level. (**Fig. 4A-C**).

"b15) determining, by the OLT, whether there are un-granted service ports of current priority service, if yes, returning to step b 11); otherwise, authorizing the ports of the next priority service";

Choksi teaches handling all requests within the highest class of service before handling lower level service requests. (**Fig. 4A-C**).

Choksi and Choi in view of Lee are analogous art because they deal with dynamic bandwidth allocation based on class of service.

It would have been obvious to one skilled in the art at the time the invention was made to use the priority-based bandwidth allocation method in Choksi with the bandwidth allocation method in Choi being that the Choksi allows definition of more levels of granularity when allocating bandwidth based on CoS/QoS and allocates bandwidth to the highest priority service first based on residual bandwidth.

As to **Claim 10**, Choi in view of Lee in view of Choksi discloses all of Claim 7 above.

Choi further discloses "generating, by the OLT, a Bandwidth Information table for those service ports requesting bandwidth control, to store transmit quantum in every bandwidth allocation polling period". Choi discloses a grant generator (**col. 5, lines 9-13**). The Bandwidth Information table is simply a data structure. It is implicit that Choi will store the granting information in some data structure.

Choi in view of Lee does not teach:

"the step of determining for those service ports requesting bandwidth control in step b12) comprises: finding out, by the OLT, transmit quantum of current service port from the Bandwidth Information table, determining whether current bandwidth resource is available according to report information from said current to-be-granted service port, transmit quantum of said current to-be-granted service port and said residual bandwidth resource in the current bandwidth allocation polling period".

Choksi teaches allocating bandwidth on a service-level basis, if the bandwidth is available (**Fig. 4A-C**).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the method for bandwidth allocation in Choksi with the method in Choi in view of Lee being that it provides a way to allocate residual bandwidth to different priority classes based on residual bandwidth available.

As to **Claim 15**, Choi in view of Lee in view of Choksi comprises all of Claim 7 as previously described above and further recites that the "uplink granting information of the present method being carried by REPORT messages". Choi further discloses receiving uplink Report Message from ONU at OLT (**Fig. 2**).

As to **Claim 19**, Choi in view of Lee in view of Choksi discloses all of Claim 10 above and further discloses the "uplink granting information of the present method being carried by REPORT messages". Choi discloses receiving uplink Report Message from ONU at OLT (**Fig. 2**).

9. **Claim 16** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Choi et al. (US Patent 7,362,975)** (hereinafter Choi) in view of **Song et al. (US PGPub 2003/0190168)** ("Song") in view of **Ganesh et al (US Patent 6,956,854)** as applied to claim 2 above, and further in view of **Liu et al. (US 6,987,753)** (hereinafter Liu).

As to **Claim 16**, Choi in view of Ganesh discloses all of Claim 2 in paragraph 6 above.

Choi in view of Ganesh does not teach:

"bandwidth allocation polling period of the present method is the virtual frame period".

Liu teaches identifying a specific portion of a frame for the polling period for dynamic bandwidth allocation, that is, a specific time slot of the frame will be used for polling while data may be transferred in other time slots within the same frame **((col. 1, lines 54-64).**

Liu and Choi in view of Ganesh are analogous art because they deal with dynamic bandwidth allocation.

It would have been obvious to one skilled in the art at the time the invention was made to use the polling slot of Liu in the method of Choi in view of Ganesh in order to send polling information with data in the upstream frame such that the device assigning the bandwidth knows where the bandwidth request from the user exists in the frame.

10. **Claims 20 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Choi et al. (US Patent 7,362,975)** (hereinafter Choi) in view of **Song et al. (US PGPub 2003/0190168)** ("Song") in view of **Lee et al. (US Patent 7,443,861)** in view of **Choksi (US Patent 6,978,144)** as applied to claims 7 and 10 above, and further in view of **Liu et al. (US 6,987,753)** (hereinafter Liu).

As to **Claim 20,** Choi in view of Song in view of Lee in view of Choksi discloses all of Claim 7.

Choi in view of Song in view of Lee in view of Choksi does not teach:

"bandwidth allocation polling period of the present method is the virtual frame period".

Liu teaches identifying a specific portion of a frame for the polling period for dynamic bandwidth allocation, that is, a specific time slot of the frame will be used for

polling while data may be transferred in other time slots within the same frame (**(col. 1, lines 54-64).**

Liu and Choi in view of Song in view of Lee in view of Choksi are analogous art because they deal with bandwidth allocation in a PON.

It would have been obvious to one skilled in the art at the time the invention was made to use the polling slot of Liu in the method of Choi in view of Song in view of Lee in view of Choksi in order to send polling information with data in the upstream frame such that the device assigning the bandwidth knows where the bandwidth request from the user exists in the frame.

As to **Claim 21**, Choi in view of Song in view of Lee in view of Choksi discloses all of Claim 10.

Choi in view of Lee in view of Choksi does not teach:

the "bandwidth allocation polling period of the present method is the virtual frame period".

The background of Liu teaches identifying a specific portion of a frame for the polling period for dynamic bandwidth allocation, that is, a specific time slot of the frame will be used for polling while data may be transferred in other time slots within the same frame (**(col. 1, lines 54-64).**

Liu and Choi in view of Song in view of Lee in view of Choksi are analogous art because they deal with dynamic bandwidth allocation in a PON.

It would have been obvious to one skilled in the art at the time the invention was made for the same reason given for claim 20 above.

Allowable Subject Matter

11. **Claim 8, 9, 11, 12, 17 and 18** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARIA L. SEKUL whose telephone number is (571)270-7636. The examiner can normally be reached on Monday - Friday 9:00-5:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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